Copies of Specifications and Standards can be obtained from:
NATIONAL STANDARDS ASSOCIATION, INC.
1321 Fourteenth Street, N. W., Washington, D. C. 20005

P-S-661b
6 APRIL 1953
SUPERSEDING
Fed. Spec. P-S-661a
3 December 1940

FEDERAL SPECIFICATION

SOLVENT, DRY-CLEANING

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope.—This specification covers two types of petroleum distillates employed for dry cleaning of textile materials, and referred to industrially as "Stoddard Solvent", and as "140° F. solvent".

1.2 Classification.—Dry-cleaning solvent shall be of the following types, as specified:

Type I. —100° F. Solvent (Stoddard Solvent)

Type II.—140° F. Solvent

2. APPLICABLE SPECIFICATION AND OTHER PUBLICATIONS

2.1 Specification. — The following Federal specification, of the issue in effect on date of invitation for bids, forms a part of this specification:

VV-L-791—Lubricants, Liquid Fuels, and Related Products; Methods of Inspection, Sampling, and Testing.

(Activities outside the Federal Government may obtain copies of Federal Specifications and Standards as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, 25, D. C.

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, Seattle, and Washington, D. C.

(Federal Government activities may obtain copies of Federal Specifications and Standards and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

2.2 Other publications. — The following publications, of the issues in effect on date of invitation for bids, forms a part of this specification:

Commercial Standards:

CS3-40—Stoddard Solvent.

174-51—140-F Drycleaning Solvent.

(Copies of Commercial Standards referenced above may be obtained upon application to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.)

2.3 Specifications and standard applicable only to individual departments are listed in section 7.

3. REQUIREMENTS

3.1 The physical requirements of dry-cleaning solvents, types I and II, shall conform to the requirements of table I.

4. SAMPLING, INSPECTION, AND TEST PROCEDURES

4.1 Sampling.—A sample of dry cleaning solvent sufficient to determine conformance of the material with this specification shall be taken at random from each lot of material. A lot shall consist of all material produced under substantially the same conditions and offered for inspection at the same time.

4.2 Inspection.—The samples of dry cleaning solvent shall be inspected for type of material, appearance, color, and odor to determine compliance with this specification. Inspection shall be in accordance with method 960.1 of Federal Specification VV-L-791. Inspection shall also include packaging, packing, and marking for shipment.

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TABLE I.—*Requirements for dry-cleaning solvents*

		Test paragraph
Appearance	Clear; free from suspended matter and undissolved water.	4.3.1
Color, Saybolt, maximum	21	4.3.2
Odor	Sweet	4.3.3
Corrosion of copper strip, maximum, 212°F., three hours	Extremely slight	4.3.4
Doctor test	Negative	4.3.5
Sulfuric acid absorption, maximum, percent	5	4.3.6
Flash point, minimum, °F.:		
Type I	100	4.3.7
Type II	138	4.3.7
Distillation range:		
Type I:		
Minimum 50 percent distilled, °F.	350	4.3.8
Minimum 90 percent distilled, °F.	375	4.3.8
End point, maximum, °F.	410	4.3.8
Type II:		
Initial boiling point, minimum, °F.	358	4.3.8
Minimum 50 percent distilled, °F.	385	4.3.8
Minimum 90 percent distilled, °F.	405	4.3.8
End point, maximum, °F.	415	4.3.8
Distillation residue, maximum, percent	1.5	4.3.8
Reaction of distillation residue to methyl orange	Not acid	4.3.9
Nonvolatile residue, maximum, grams per 100 milliliters	0.020	4.3.10

4.3 Tests.

4.3.1 *Appearance.* — Examine for clarity, absence of suspended matter, and undissolved water.

4.3.2 *Color.*—Color shall be determined by the Saybolt Chromometer method 10.1 of Federal Specification VV-L-791. (Twenty-one Saybolt color is the equivalent of a freshly prepared solution of potassium bichromate ($K_2Cr_2O_7$) in distilled water, containing 0.0048 gram of $K_2Cr_2O_7$ per liter.)

4.3.3 *Odor.* — If the odor is questionable the following test shall be performed. Desized and laundered bleached cotton cloth of 3.6 to 4.0 ounces per square yard shall be used for this test. The cloth when lightly steamed shall have no odor except that of clean cotton cloth. The cloth shall be conditioned at 50 to 80 percent R.H. and 65° to 90° F. for 4 hours. A piece of the conditioned cloth approximately 12 inches square shall be placed in 100 milliliters of solvent so as to be completely submerged, and allowed to soak for 5 minutes. The cloth shall then be removed, drained, but not squeezed or extracted and hung at room temperature for 2 hours. The cloth shall then be dried in a stream of fresh air heated to 140° to 160° F. (60° to 71° C.) for 1 hour. The odor of the dried cloth when steamed over boiling water for 4 to 5 seconds, shall not differ from that of an untreated sample similarly steamed.

4.3.4 *Corrosion test.*—Corrosion test shall be performed in accordance with method 530.3 of Federal Specification VV-L-791.

4.3.5 *Doctor test.* — Doctor test shall be performed in accordance with method 520.3 in Federal Specification VV-L-791.

4.3.6 *Sulfuric acid absorption test.*

4.3.6.1 *Apparatus.*

4.3.6.1.1 *Babcock bottle.* — One modified Babcock bottle with ground-glass stopper, graduated to 0.2 milliliter (see figure 1). The total height of the bottle, including stopper,

shall be 7¾ to 8 inches (18.7 to 20.3 centimeters). The bulb shall have an outside diameter of between 35 and 37 millimeters. The graduated portion of the neck shall have a length of 2½ to 3 inches (63.5 to 76.2 millimeters). The total percent graduation shall be 100, subdivided to 2 percent. Each 10-percent line shall be longer than 2 percent, and shall be numbered, placing the numbers at the right of the scale. The capacity of the neck for each whole percent shall be 0.10 milliliter. The maximum error of the total graduation or any part thereof shall not exceed one-half the volume of the least graduation (1 percent or 0.10 milliliter). The 100-percent mark shall be 28 millimeters ± 1 millimeter from the top of the neck. The distance between bottom of the stopper and the uppermost graduation shall be not less than 10 millimeters. The stopper and bottle shall bear a corresponding serial number. The neck shall be provided with an accurately ground glass stopper.

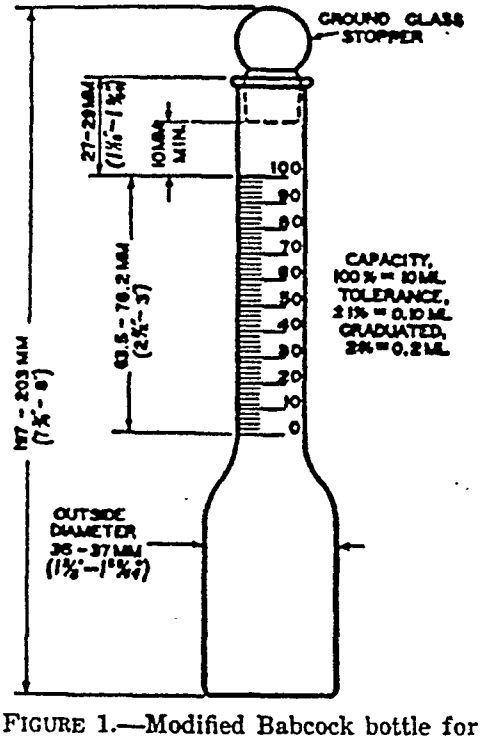

FIGURE 1.—Modified Babcock bottle for unsaturation tests.

4.3.6.1.2 One 50-milliliter graduated cylinder.

4.3.6.1.3 One 10-milliliter pipette standardized to agree with the stoppered Babcock bottle specified in 4.3.6.1.1.

4.3.6.2 *Procedure.*—Bring the temperature of the sample to 20° ± 1° C. Measure out 10 milliliters of the sample into the clean, dry modified Babcock bottle with the standard pipette and cool in ice water for 5 minutes. Add from a graduate 20 milliliters of reagent-grade sulfuric acid (93.2 ± 0.3 percent concentration, by titration), previously cooled in ice water for five minutes. The acid should be poured down the side of the bottle to prevent splashing. Again cool by allowing the bottle to stand in ice water for 10 minutes, so that the water level is above the level of the sample in the bottle. Remove the Babcock bottle from the water bath, place glass stopper previously wet with sulfuric acid in bottle and shake it violently for 60 ± 5 seconds. Carefully add to the bottle sufficient sulfuric acid to bring the liquid level almost to the top graduation. Centrifuge to obtain a sharp separation of the two phases, or allow the stoppered bottle to stand overnight (at least 12 hours is necessary). Place the bottle in a water bath at 20° ± 1° C. for 15 minutes. Add sulfuric acid, previously brought to the temperature of 20° C., to bring the liquid level exactly to the top graduation. Read the quantity absorbed in sulfuric acid on the scale.

4.3.7 *Flash point.* — Flash point shall be determined by method 110.1 of Federal Specification VV-L-791.

4.3.8 *Distillation.*

4.3.8.1 *Distillation range.*—The distillation test shall be made according to method 100.1 of Federal Specification VV-L-791.

4.3.8.2 *Residue.*—The residue after distillation shall be determined as described in paragraph 4.6 of method 100.1 of Federal Specification VV-L-791.

4.3.9 *Acidity.* — This test shall be made immediately after recording the volume of reisdue. Transfer the cooled residue to a test tube, add three volumes of distilled water, and shake the tube thoroughly. Allow the mixture to separate and remove the aqueous layer to a clean test tube by means of a pipette. Add 1 drop of 0.1 percent solution of methyl orange. The aqueous layer shall not show an acid reaction to methyl orange.

4.3.10 *Nonvolatile residue.*—Transfer 100 milliliters of solvent, measured in a 100-milliliter graduated cylinder, to a clean, tared 90 ± 5 milliliter porcelain evaporating dish weighing no more than 80 grams. Evaporate practically to dryness on a steam bath. Heat the dish and residue in a drying oven at 105° ± 2.5° C. to a constant weight, cool in a desiccator, and weigh on an analytical balance.

5. PREPARATION FOR DELIVERY

5.1 **Packaging.** — Unless otherwise specified, commercial packages are acceptable under this specification (see 6.6).

5.2 **Packing.**—Unless otherwise specified, the subject commodity shall be delivered in standard commercial containers, so constructed as to insure acceptance by common or other carriers, for safe transportation, at the lowest rate to the point of delivery (see 6.6).

5.3 **Marking.**—Unless otherwise specified, shipping containers shall be marked with the name of the material and the quantity contained therein, as defined by the contract or order under which shipment is made, the name of the contractor, and the number of the contract or order.

6. NOTES

6.1 **Intended use.** — Type I dry-cleaning solvent, 100° F. flash-point, conforms to the requirements of Stoddard Solvent-Commercial Standard CS3–40, issued by the National Bureau of Standards, Department of Commerce and is suitable for use as a comparatively safe dry-cleaning solvent. Type II dry-cleaning solvent, 140° F. flash-point, conforms to the requirements of Commercial Standard 174–51 and is intended for use in dry-cleaning plants such as shipboard installations etc., where a solvent with a higher flash-point is desirable as an additional safety factor. Type I and type II solvents are also used for cleaning metal parts prior to plating, painting, or preservation. They are used in spray, brush, and dip-soak operations.

6.2 **Ordering data.** — Procurement documents should specify the following:

(a) Type of dry cleaning solvent required (see 1.2).

(b) Style and size of shipping container required (see 5.1, 7.2.2, and 7.2.3).

(c) Requests for bids shall state whether the unit of purchase is the gallon, pound, or 100 pounds (see 6.3).

6.3 **Purchase unit.**—Dry cleaning solvent shall be furnished either (a) by volume, the unit being a gallon of 231 cubic inches at 60° F. (15.5° C.), or (b) by weight in units of a pound or of 100 pounds. The exact weight in pounds per gallon of any sample may be determined by multiplying the specific gravity at 60°/60° F. (15.5°/15.5° C.) by 8.33.

6.4 **Correction of volume.**—If the volume of dry-cleaning solvent is corrected to the standard temperature of 60° F., the correction shall be made by means of factors given for group 2 of the supplement to Circular N. 410—Abridged Volume Correction Table for Petroleum Oils, issued by the National Bureau of Standards, Washington 25, D. C., and included in Federal Specification VV–L–791, method 900.1.1. Volume corrections ordinarily are not made on less than tank car deliveries.

6.5 **Transportation description.**

6.5.1 *Transportation description applicable to these items is:*

Cleaning compounds, not otherwise indexed by name, liquid.
Carload weight 36,000 pounds.
Truckload volume weight 36,000 pounds.

6.6 **Certification.** — Dry cleaning solvent delivered in cans, drums, or tank cars shall either be accompanied by an official gager's certificate showing the net contents of each container and also the temperature of contents at the time of gaging, or shall be subject to gaging by the Government inspector. In the absence of a statement of the temperature at the time of gaging on the official gager's certificate, or in case the barrels show evidence of loss by leakage or other shortage, the delivery shall be subject to reinspection and regaging by the Government inspector.

7. DEPARTMENTAL REQUIREMENTS

7.1 The following specifications and standard, of the issues in effect on date of invitation for bids, and special requirements, form a part of this specification for purchases made under this specification by the respective departments.

7.2 Army, Navy, and Air Force.

7.2.1 *Applicable specifications and standard.*

Federal Specification:
RR–D–729—Drums; Steel, Type 5B (for Liquid Petroleum Products).

Military Specification:
MIL–C–124—Containers (Cans, Pails, and Drums) Metal (for Other Than Subsistence Items).

Navy Department Specification:
General Specifications for Inspection of Material.

Military Standard:
MIL–STD–129—Marking of Shipments.

(Copies of specifications and standard required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

7.2.2 *Packaging for domestic shipment and storage or overseas shipment.*

7.2.2.1 The dry cleaning solvent shall be furnished in 1-gallon metal cans, 5-gallon steel drums, 55-gallon steel drums, or shall be loaded in tank cars, as specified in the contract or order.

7.2.2.2 One-gallon cans shall conform to type I requirements of Military Specification MIL–C–124. Screw-cap closures shall be provided and inner-friction metal seals shall also be furnished.

7.2.2.3 Five-gallon steel drums shall conform to the type V requirements of Military Specification MIL–C–124. Screw caps or nozzles and screw-cap closures shall be provided. Inner-friction metal seals shall also be furnished.

7.2.2.4 Unless otherwise specified in the contract or order, 55-gallon closed-top steel drums shall conform to Federal Specification RR–D–729.

7.2.3 *Packing for domestic shipment and storage or overseas shipment.*

7.2.3.1 The arrangement of the 1-gallon metal cans and the shipping containers shall be in accordance with the applicable requirements of Appendix I of Military Specification MIL–C–124.

7.2.3.2 Each can shall be separated and cushioned from adjacent cans as specified in Appendix I of Military Specification MIL-C-124.

7.2.3.3 Five-gallon steel drums and 55-gallon steel drums will require no further packing.

7.2.4 *Marking.*—In addition to any marking required by the contract or order interior and exterior containers shall be marked in accordance with Military Standard MIL-STD-129.

7.2.5 *Inspection procedures (Navy only).*—For Naval purchases the general inspection procedures shall be in accordance with the General Specifications for Inspection of Material.

NAVY INTEREST: A *MC* Sh S

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Copies of this specification may be purchased for 5 cents.

INTERIM AMENDMENT
TO
FEDERAL SPECIFICATION

SOLVENT, DRY-CLEANING

(This Interim Amendment was developed by the General Services Administration, Federal Supply Service, Washington 25, D. C. Its use is authorized in procurement by GSA as a part of Federal Specification P-S-661b, Solvent, Dry-Cleaning, dated April 5, 1956. It will be converted to a regular amendment after further coordination.)

Page 2, Table I, delete line 2 and substitute:

Color, Saybolt	Not darker than +21	4.3.2

Copies of Specifications and Standards can be obtained from:
NATIONAL STANDARDS ASSOCIATION, INC.
1321 Fourteenth Street, N. W., Washington, D. C. 20005

P–S–661b
CANCELLATION
March 27, 1963

FEDERAL SPECIFICATION

SOLVENT, DRY-CLEANING

This cancellation was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

Federal Specification P–S–661b, dated April 6, 1953, has been superseded by Federal Specification P–D–680, Dry Cleaning Solvent, dated March 27, 1963.

FSC 6850

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